General

Guideline Title

Osteoporosis. In: Guidelines for preventive activities in general practice, 8th edition.

Bibliographic Source(s)

Osteoporosis. In: Guidelines for preventive activities in general practice, 8th edition. East Melbourne (Australia): Royal Australian College of General Practitioners; 2012. p. 82-4.

Guideline Status

This is the current release of the guideline.

Recommendations

Major Recommendations

The levels of evidence (I-IV, Practice Point) and grades of recommendations (A-D) are defined at the end of the "Major Recommendations" field.

Osteoporosis

Review of fracture risk factors for women aged over 45 years and men aged over 50 years is recommended (C). Those with increased risk should have bone density assessed (A).

Osteoporosis is a disease characterised by low bone mass and micro-architectural deterioration of bone tissue, leading to bone fragility and increased fracture risk (National Health and Medical Research Council, 2010). It is diagnosed on the presence of a fragility fracture (fracture from the equivalent of a fall from standing height or less, or a fracture that under normal circumstances would not be expected in a healthy young man or woman). For epidemiological and clinical purposes, osteoporosis is defined by bone mineral density (BMD) as a T-score of ≤-2.5. However, age, lifestyle factors, family history and some medications and diseases all contribute to bone loss and increased risk of fragility fractures. Thus, the goal of prevention and treatment is to reduce a person's overall fracture risk (not just bone density maintenance).

Methods to estimate absolute fracture risk for osteoporotic fractures are available at:

- www.shef.ac.uk/FRAX
- http://garvan.org.au/promotions/bone-fracture-risk/calculator/

As bone densitometry is part of these estimates, BMD should be considered as part of the overall fracture risk assessment (D). Risk estimation is imperfect, but the calculator's predictive performance is similar to absolute cardiovascular risk calculators (Nelson et al., 2010). Risk factors (e.g., falls, glucocorticoid use, etc.) not included in one or other risk algorithm require clinical judgement to modify the risk estimate.

To date, there are no randomised controlled trials (RCT) directly evaluating screening effectiveness, harms and intervals, whether screening is performed by bone density screening by dual-energy X-ray absorptiometry (DXA) or by estimating absolute fracture risk. The place of absolute fracture risk assessment in the prevention and management of osteoporosis requires further clarification as its effectiveness is yet to be tested.

Osteoporosis: Identifying Risk

Who Is at Risk?	What Should Be Done?	How Often?	References
Average Risk • Postmenopausal women (aged 45 years or older) • Men aged 50 years or older	Assessment for risk factors (II,C) Preventive advice (II,C)	Every 12 months (Practice Point)	National Health and Medical Research Council (NHMRC), 2010; Nelson et al., 2010

Increased Risk
• Age >60 years for men and >50 years for women plus any of:
  • Family history of fragility fracture
  • Smoking
  • High alcohol intake (>2–4 standard drinks per day for men, less for women)
  • Vitamin D deficiency <60 nmol (screening for vitamin D not indicated just for risk assessment)
  • Low body weight (body mass index [BMI] <20)
  • Recurrent falls
  • Low levels of physical activity
  • Immobility (to the extent that person cannot leave their home or cannot do any housework)
• Medical conditions and medications that may cause secondary osteoporosis:
  • Endocrine (e.g., hypogonadism, Cushing syndrome, hyperparathyroidism, hyperthyroidism)
  • Inflammatory conditions (e.g., rheumatoid arthritis)
  • Malabsorption (e.g., coeliac)
  • Chronic kidney disease (CKD), chronic liver disease
  • Drugs, especially corticosteroids (e.g., 7.5 mg x 3 months) used for immunosuppression including as part of chronic anti-rejection therapy in organ or bone marrow transplant, antiepileptic, aromatase inhibitors, anti-androgen, excessive thyroxine, possibly selective serotonin reuptake inhibitors (also known as SSRIs)
	Bone mineral densitometry (BMD) and management of risk factors (II,A)
	
	Investigate for causes of secondary osteoporosis if indicated by history, examination findings or BMD result (Practice Point).
		At presentation and no more than every 2 years. Repeat when it is likely to change management (II,C).
		
		Where there is a specific bone mineral wasting condition or medication, consider more frequent repeat of dual-energy X-ray absorptiometry (DXA) if likely to change treatment (Practice Point).
			U.S. Preventive Services Task Force, 2011; Nakamura et al., 2012

High Risk of Further Fracture • Patients aged over 45 years who sustain a low trauma	BMD and management of risk	DXA at presentation and no more than every 2 years (II,B)	NHMRC, 2010

Who Is at Risk?	What Should Be Done?	How Often?	References
fracture • Postmenopausal women, and men with a suspected vertebral fracture (loss of height >3 cm, kyphosis, back pain)	factors (II,A) Investigate for causes of secondary osteoporosis if indicated by history, examination findings or BMD result (Practice Point). Recommend that such individuals are initiated on effective anti-osteoporosis therapy unless there are specific contraindications.	Repeat only when it is likely to change management (Practice Point). Where there is a specific bone mineral wasting condition or medication, consider more frequent repeat of DXA (Practice Point).	

Osteoporosis: Preventive Interventions

Intervention	Technique	References
Assessment of risk factors	Take a thorough history, paying particular attention to the risk factors above plus: • Vertebral deformity (if within 5–10 years, this is equivalent risk as any other fragility fracture) • Loss of height (>3 cm) and/or thoracic kyphosis (consider lateral spine X-ray for vertebral deformity) • Premature menopause • Anorexia nervosa or amenorrhea for greater than 12 months before age 45 years	
Preventive actions	• Ensure adequate daily calcium intake: dietary calcium ([A] for prevention of bone loss, [C] for fracture) 1,200 mg/day. Exercise caution with supplements.* • Encourage healthy lifestyle (e.g., smoking cessation and limiting alcohol and caffeine intake). (D) • Education and psychosocial support for risk factor modification (Practice Point) • Falls reduction strategies: for fracture risk reduction (Practice Point) • Encourage exercise: for prevention of bone loss (A) and fracture risk reduction (Practice Point) • Advise on safe sun exposure levels as a source of vitamin D.† (II,C) • Discuss absolute risk of fracture. (Practice Point)	
Bone mineral densitometry (BMD)	BMD should be measured by dual-energy X-ray absorptiometry (DXA) scanning performed on 2 sites, preferably anteroposterior spine and hip. Without bone-losing medical conditions (e.g., steroid use), it is unlikely to change significantly in less than 2 years (II,B) and DXA should generally be repeated only when patient is at risk of reaching treatment thresholds (average decrease in T-score is usually approx 0.1/year if no specific bone-losing medical conditions) (Practice Point). Rate of bone loss tends to be slower in early older age (60+) than in later old age (80+), and slower in men than women.	Frost et al., 2009

*Controversial level II evidence of increased risk of cardiovascular events with calcium supplements in postmenopausal women, not seen in dietary studies (Bolland et al., 2008; Bolland, 2010; Lewis et al., 2011).

†Population screening for vitamin D deficiency is not recommended, but targeted testing of people who are at risk of osteoporosis and who are at high risk of vitamin D deficiency should be considered. Vitamin D supplements could be considered in deficient individuals if increasing sun exposure is contraindicated or not feasible or if deficiency is more than mild (i.e., <25 nmol/L) and so is less likely to be corrected by safe sun exposure (Winzenberg et al., 2012) (Practice Point).

Definitions:

Levels of Evidence

Level	Explanation
I	Evidence obtained from a systematic review of level II studies
II	Evidence obtained from a randomised controlled trial (RCT)
III–1	Evidence obtained from a pseudo-randomised controlled trial (i.e., alternate allocation or some other method)
III–2	Evidence obtained from a comparative study with concurrent controls: • Non-randomised, experimental trial • Cohort study • Case–control study • Interrupted time series with a control group
III–3	Evidence obtained from a comparative study without concurrent controls: • Historical control study • Two or more single arm study • Interrupted time series without a parallel control group
IV	Case series with either post-test or pre-test/post-test outcomes
Practice Point	Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees

Grades of Recommendations

Grade	Explanation
A	Body of evidence can be trusted to guide practice
B	Body of evidence can be trusted to guide practice in most situations
C	Body of evidence provides some support for recommendation(s) but care should be taken in its application
D	Body of evidence is weak and recommendation must be applied with caution

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

- Osteoporosis
- Osteoporotic fractures

Guideline Category

Counseling

Prevention

Risk Assessment

Screening

Clinical Specialty

Family Practice

Geriatrics

Internal Medicine

Obstetrics and Gynecology

Preventive Medicine

Rheumatology

Intended Users

Advanced Practice Nurses

Health Care Providers

Physician Assistants

Physicians

Public Health Departments

Guideline Objective(s)

- To facilitate evidence-based preventive activities for osteoporosis in primary care
- To provide a comprehensive and concise set of recommendations for patients in general practice with additional information about tailoring risk and need
- To provide the evidence base for which primary healthcare resources can be used efficiently and effectively while providing a rational basis to ensure the best use of time and resources in general practice

Target Population

- Australian women aged ≥45 years
- Australian men aged ≥50 years

Interventions and Practices Considered

1. Assessment of risk factors for osteoporosis (thorough patient history)
2. Preventive advice
    - Ensuring adequate calcium intake
    - Encouraging healthy lifestyle (e.g., smoking cessation, limiting alcohol and caffeine)
    - Education and psychosocial support for risk factor modification
    - Falls reduction strategies
    - Encouraging exercise
    - Advice on safe sun exposure levels

    - Discussing absolute fracture risk
3. Bone mineral density measured by dual-energy X-ray absorptiometry (DXA)
4. Management of risk factors
5. Investigations for causes of secondary osteoporosis
6. Initiation of anti-osteoporotic therapy, if indicated

Major Outcomes Considered

Risk of fracture

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Sources of Recommendations

The recommendations in these guidelines are based on current, evidence-based guidelines for preventive activities. The Taskforce focused on those most relevant to Australian general practice. Usually this means that the recommendations are based on Australian guidelines such as those endorsed by the National Health and Medical Research Council (NHMRC).

In cases where these are not available or recent, other Australian sources have been used, such as guidelines from the Heart Foundation, Canadian or United States preventive guidelines, or the results of systematic reviews. References to support these recommendations are listed. However, particular references may relate to only part of the recommendation (e.g., only relating to one of the high-risk groups listed) and other references in the section may have been considered in formulating the overall recommendation.

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Levels of Evidence

Level	Explanation
I	Evidence obtained from a systematic review of level II studies
II	Evidence obtained from a randomised controlled trial (RCT)
III–1	Evidence obtained from a pseudo-randomised controlled trial (i.e., alternate allocation or some other method)

Level	Explanation
III–2	Evidence obtained from a comparative study with concurrent controls: • Non-randomised, experimental trial • Cohort study • Case–control study • Interrupted time series with a control group
III–3	Evidence obtained from a comparative study without concurrent controls: • Historical control study • Two or more single arm study • Interrupted time series without a parallel control group
IV	Case series with either post-test or pre-test/post-test outcomes
Practice Point	Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review

Description of the Methods Used to Analyze the Evidence

Not stated

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

These *Guidelines for preventive activities in general practice*, 8th edition, have been developed by a taskforce of general practitioners (GPs) and experts to ensure that the content is the most valuable and useful for GPs and their teams. The guidelines provide an easy, practical and succinct resource. The content broadly conforms to the highest evidence-based standards according to the principles underlying the Appraisal of Guidelines Research and Evaluation.

The dimensions addressed are:

- Scope and purpose
- Clarity of presentation
- Rigour of development
- Stakeholder involvement
- Applicability
- Editorial independence

The Red Book maintains developmental rigour, editorial independence, relevance and applicability to general practice.

Screening Principles

The World Health Organization (WHO) has produced guidelines for the effectiveness of screening programs. The Taskforce has kept these and the United Kingdom National Health Services' guidelines in mind in the development of recommendations about screening and preventive care.

Rating Scheme for the Strength of the Recommendations

Grades of Recommendations

Grade	Explanation
A	Body of evidence can be trusted to guide practice
B	Body of evidence can be trusted to guide practice in most situations
C	Body of evidence provides some support for recommendation(s) but care should be taken in its application
D	Body of evidence is weak and recommendation must be applied with caution

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Peer Review

Description of Method of Guideline Validation

Not stated

Evidence Supporting the Recommendations

References Supporting the Recommendations

Bolland MJ, Avenell A, Baron JA, Grey A, MacLennan GS, Gamble GD, Reid IR. Effect of calcium supplements on risk of myocardial infarction and cardiovascular events: meta-analysis. BMJ. 2010;341:c3691. [58 references] PubMed

Bolland MJ, Barber PA, Doughty RN, Mason B, Horne A, Ames R, Gamble GD, Grey A, Reid IR. Vascular events in healthy older women receiving calcium supplementation: randomised controlled trial. BMJ. 2008 Feb 2;336(7638):262-6. PubMed

Frost SA, Nguyen ND, Center JR, Eisman JA, Nguyen TV. Timing of repeat BMD measurements: development of an absolute risk-based prognostic model. J Bone Miner Res. 2009 Nov;24(11):1800-7. PubMed

Lewis JR, Calver J, Zhu K, Flicker L, Prince RL. Response to 'calcium supplements and cardiovascular risk'. J Bone Miner Res. 2011;26(4):900-1.

Nakamura T, Tsujimoto M, Hamaya E, Sowa H, Chen P. Consistency of fracture risk reduction in Japanese and Caucasian osteoporosis patients treated with teriparatide: a meta-analysis. J Bone Miner Metab. 2012 May;30(3):321-5. PubMed

National Health and Medical Research Council. Clinical guideline for the prevention and treatment of osteoporosis in postmenopausal women and older men. South Melbourne, Victoria: Royal Australian College of General Practitioners; 2010 Feb. 83 p.

Nelson HD, Haney EM, Chou R, Dana T, Fu R, Bougatsos C. Screening for osteoporosis: systematic review to update the 2002 U.S. Preventive Services Task Force recommendation. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2010 Jul. (Evidence Syntheses; no. 77). PubMed

U.S. Preventive Services Task Force. Screening for osteoporosis: clinical summary of U.S. Preventive Services Task Force Recommendation. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2011.

Winzenberg T, van der Mei I, Mason RS, Nowson C, Jones G. Vitamin D and the musculoskeletal health of older adults. Aust Fam Physician. 2012 Mar;41(3):92-9. PubMed

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for selected recommendations (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

- The goal of prevention and treatment is to reduce a person's overall fracture risk (not just bone density maintenance).
- Those with a previous fragility fracture have a very high risk of further fracture, and have greatest benefit from specific anti-osteoporosis treatment.

Potential Harms

Not stated

Qualifying Statements

Qualifying Statements

- The information set out in this publication is current at the date of first publication and is intended for use as a guide of a general nature only and may or may not be relevant to particular patients or circumstances. Nor is this publication exhaustive of the subject matter. Persons implementing any recommendations contained in this publication must exercise their own independent skill or judgement or seek appropriate professional advice relevant to their own particular circumstances when so doing. Compliance with any recommendations cannot of itself guarantee discharge of the duty of care owed to patients and others coming into contact with the health professional and the premises from which the health professional operates.
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- These guidelines have not included detailed information on the management of risk factors or early disease (e.g., what medications to use in treating hypertension). Similarly, they have not made recommendations about tertiary prevention (preventing complications in those with established disease). Also, information about prevention of infectious diseases has been limited largely to immunisation and some sexually transmitted infections (STIs).

Implementation of the Guideline

Description of Implementation Strategy

For preventive care to be most effective, it needs to be planned, implemented and evaluated. Planning and engaging in preventive health is increasingly expected by patients. The Royal Australian College of General Practitioners (RACGP) thus provides the Red Book and *National guide to inform evidence-based guidelines*, and the Green Book (see the "Availability of Companion Documents" field) to assist in development of programs of implementation. The RACGP is planning to introduce a small set of voluntary clinical indicators to enable practices to monitor their preventive activities.

Implementation Tools

Chart Documentation/Checklists/Forms

Resources

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

Osteoporosis. In: Guidelines for preventive activities in general practice, 8th edition. East Melbourne (Australia): Royal Australian College of General Practitioners; 2012. p. 82-4.

Adaptation

This guideline has been partially adapted from Australian, Canadian, United Kingdom, and/or United States preventive guidelines.

Date Released

2012

Guideline Developer(s)

Royal Australian College of General Practitioners - Professional Association

Source(s) of Funding

Royal Australian College of General Practitioners

Guideline Committee

Red Book Taskforce

Composition of Group That Authored the Guideline

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Financial Disclosures/Conflicts of Interest

Not stated

Guideline Status

This is the current release of the guideline.

Guideline Availability

Electronic copies: Available in Portable Document Format (PDF) from the Royal Australian College of General Practitioners (RACGP) Web site .

Availability of Companion Documents

The following are available:

- Preventive activities over the lifecycle – adults. Preventive activities over the lifecycle – children. Electronic copies: Available in Portable

Document Format (PDF) from the Royal Australian College of General Practitioners (RACGP) Web site .

- Putting prevention into practice (green book). East Melbourne (Australia): Royal Australian College of General Practitioners; 2006. 104 p. Electronic copies: Available in PDF from the RACGP Web site .
- National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people. East Melbourne (Australia): Royal Australian College of General Practitioners; 2012. 100 p. Electronic copies: Available in PDF from the RACGP Web site .

Patient Resources

None available

NGC Status

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